CITY OF MURTAUGH (PWS 5420042)
SOURCE WATER ASSESSMENT UPDATED FINAL REPORT

June 2, 2004

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment Update for City of Murtaugh, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The City of Murtaugh (PWS 5420042) drinking water system consists of two ground water sources, City Well and Well #2. However, Well #2 did not encounter sufficient water to be viable during drilling. Well #2 will not attain "active" status, but instead is in the process of being properly plugged and abandoned according to the regulations. In addition, a different drill site is being identified. Though the delineation and susceptibility of Well #2 is detailed in this report, the City of Murtaugh does not intend to bring Well #2 online.

A review of the Idaho Drinking Water Information System (DWIMS) and the State Drinking Water Information System (SDWIS) revealed water quality information for the City of Murtaugh drinking water system. No SOCs or microbial contaminants were recorded in the tested drinking water.

A single detection of trihalomethanes in the City Well water, far below the Maximum Contaminant Level (MCL), was recorded in August 2000. The City of Murtaugh treats its drinking water with chlorine prior to distribution. Trihalomethanes are commonly detected in water treated with chlorine. Consequently, the detection of trihalomethanes in the treated water is not considered source water contamination. No other VOCs were detected in the drinking water.

In March 1997 and again in August 2000, arsenic was detected in the City Well water at concentrations of 0.007 milligrams per liter (mg/l) and 0.010 mg/l, respectively. In October 2001, the EPA lowered the arsenic maximum contaminant level (MCL) from 0.050 mg/L to 0.010 mg/L. However, public water systems have until 2006 to meet the new requirement. The City of Murtaugh should monitor arsenic levels closely as the one arsenic detection was at the revised MCL level.

In March 1997, barium and chromium were detected in the City Well water at concentrations of 0.067 mg/l and 0.002 mg/l, respectively. These detections were far below the MCLs for barium (2.0 mg/l) and chromium (0.1 mg/l). The IOCs arsenic, barium, and chromium, detected in the City Well water may be naturally occurring in the formations in which the well was developed. From December 1997 to August 2000, nitrate was detected in the City Well water at concentrations ranging from 0.26 mg/l to 7.9 mg/l in five samples. The highest concentration of nitrate detected in the City Well water in September 1999 is just under 80% of the MCL for nitrate of 10 mg/l. When levels of contaminants exceed 50% of the MCL the contaminant of concern is required to be noted in the Consumer Confidence Report (CCR).

In terms of total susceptibility, both the City Well and Well #2 rated high for susceptibility to IOC, VOC, SOC and microbial contaminants. The high ratings are mainly due to the aquifer properties, high countywide farm chemical use, the presence of a nitrate priority area, and multiple potential contaminant sources within the source water assessment areas. Lack of some information (City Well log, sanitary survey of Well #2) also made some of the scores be conservatively raised.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

In January 2003, the Idaho Department of Environmental Quality (DEQ) certified the City of Murtaugh Drinking Water Protection Plan for drinking water taken from the City Well. The designation is based upon a committee finding that all certification requirements were fulfilled. These requirements include:

1. The formation of a community planning team
2. A delineation of the City Well source water protection area
3. An inventory of potential sources of contamination
4. Management tools and protection measures that will be pursued to manage potential sources of contamination
5. A contingency plan
6. A protection strategy for new wells
7. A public participation and education component
8. An implementation strategy.

This SWA report updates the previous report with information on Well #2. When the Drinking Water Protection Plan is updated or implemented, this new information regarding Well #2, or similar information regarding an additional well should be added to fully protect the drinking water resource. Well #2 will not attain "active" status, but instead is in the process of being properly plugged and abandoned according to the regulations. In addition, a different drill site is being identified. Though the delineation and susceptibility of Well #2 is detailed in this report, the City of Murtaugh does not intend to bring Well #2 online.

For the City of Murtaugh, drinking water protection activities should first focus on correcting, if corrections have not been completed, the deficiencies outlined in the Sanitary Survey. A Sanitary Survey conducted in 1999 recommended installing a down turned, screened vent tube, removing hazardous materials from the well house, replacing the vacuum breaker, and repairing the leaking fuel pump in order to prevent potential contamination at the wellhead.

Since nitrate concentrations in The City Well approach the MCL, the City of Murtaugh should investigate various systems like ion exchange, reverse osmosis, or activated alumina that could be used to treat nitrates. Disinfection practices should be optimized in order to minimize the formation of trihalomethanes in the water extracted from the City Well. Any spills from the multiple potential contaminant sources within the source water assessment area should be monitored carefully. Most of the source water protection designated areas are outside the direct jurisdiction of City of Murtaugh. Twin Falls County has a Wellhead Protection Overlay District Ordinance that can provide additional protection for areas outside of the direct jurisdiction of the City of Murtaugh. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed drinking water protection program will incorporate many strategies. For assistance in updated and implementing protection strategies please contact the Twin Falls Regional Office of the DEQ or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT UPDATE FOR CITY OF MURTAUGH, TWIN FALLS COUNTY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is attached.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

The DEQ is required by the EPA to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments for sources active prior to 1999 were completed by May of 2003. SWAs for sources activated post-1999 are being developed on a case-by-case basis. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Murtaugh drinking water system is a community system that serves approximately 130 people through 85 connections. The public drinking water system for City of Murtaugh is currently comprised of two ground water wells, the City Well and Well #2. The City Well is located in Murtaugh, Idaho, west of Dry Creek and south of the Snake River. Well #2 is located about ½ mile south of the City Well (Figure 1).

Arsenic and nitrate represent the main water chemistry issues recorded for the public water system. Arsenic was detected in the City Well water in March 1997 and August 2000 at concentrations near to (0.007 mg/L) and just at (0.010 mg/L) the current MCL. Nitrate was detected in the City Well water from December 1997 to August 2000 at concentrations just below 80% of the MCL. Single detections of barium, chromium, and trihalomethanes were reported for the City Well water at concentrations well below the respective MCLs. The IOCs arsenic, barium, and chromium, detected in the City Well water, may be naturally occurring in the formations in which the well was developed. No VOCs (other than trihalomethanes), SOCs, or microbial contaminants were recorded for the City Well water.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Snake River Plain Aquifer in the vicinity of Murtaugh, Idaho. The computer model used site specific data, assimilated by DEQ from a variety of sources including the City of Murtaugh well logs, other local area well logs, and hydrogeologic reports summarized below.

The City of Murtaugh wells extract water from the Banbury Basalt, which overlies the Idavada Volcanics. The Idavada Volcanics unit consists of welded ash and tuff, rhyolite, and some basalt flows. The Idavada Volcanics are up to 2,000 feet thick in the Murtaugh area and contain fractures and columnar joints, allowing some mixing of the geothermal groundwater in the Idavada Volcanics with groundwater in the Banbury Basalt (Lewis and Young, 1989). The Banbury Basalt is of variable thickness and is the primary non-geothermal aquifer in the Murtaugh area (Moffat and Jones, 1984). Basalt flows fracture at the surface as they cool. The fractures occur in the horizontal direction throughout the flow. The Banbury Basalt is fractured and contains thin sedimentary interbeds. These fractures and sedimentary interbeds comprise the water producing zones in the Banbury Basalt. (Cosgrove, et al., 1997). Regional ground water flow is to the north, but may vary with proximity to major creeks and the Snake River (Lewis and Young, 1989). Precipitation in the area is approximately 9 inches per year (Lewis and Young, 1989). Infiltration occurs in the area due to irrigation practices as well as canal seepage and loss from surface waters such as Murtaugh Lake (Cosgrove, et al., 1997).

The delineated source water assessment area for the City Well can best be described as a corridor, approximately 1.0 mile wide and greater than two (2) miles long, extending to the south from City of Murtaugh and terminating at Murtaugh Lake (Figure 2). The delineated source water assessment area for Well #2 can best be described as an elliptical corridor, approximately one mile wide and five miles long, extending to the south from City of Murtaugh (Figure 3). The actual data used by DEQ in determining the source water assessment delineation area is available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use outside the City of Murtaugh area is irrigated agriculture. Land use within the immediate area of the wellheads consists of urban commercial and residential property.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination. These involve educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A contaminant inventory of the City Well study area was conducted during April 2001. A contaminant inventory of the Well #2 study area was conducted during July 2003. This process involved identifying and documenting potential contaminant sources within the City of Murtaugh source water assessment areas through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. DEQ has updated the wastewater land application (WLAP) thematic database since the writing of the initial report.

The City Well has a delineated source water assessment area that is crossed by the Union Pacific Railroad, Highway 30, the Twin Falls Main Canal, and Murtaugh Lake (Table 1). Highway 30 and the Union Pacific Railroad represent potential sources of contamination because they are transportation corridors. Accidental releases of contaminants on these corridors, within the source water assessment area, could spill IOCs, VOCs, SOCs, or microbial contaminants on to the well-drained soil. These potential contaminants could migrate down through the fractured basalt in the vadose zone and

possibly contaminate the City of Murtaugh's source water. Similarly, the Twin Falls Main Canal and Murtaugh Lake are listed as a potential contaminant source because leakage from canals and surface water bodies in the source water assessment area is known to recharge the aquifer (Cosgrove, et al., 1997). Consequently, if a spill occurs and contaminants are transported through the source water assessment area by the canal or the lake, contaminants could leach into the City of Murtaugh's source water.

Ten other identified potential sources of contamination are located in the source water assessment area, nine of them in the 3-year time of travel zone. Figure 2 shows the locations of these various potential contaminant sites relative to the wellhead.

Table 1. City of Murtaugh, City Well, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	Union Pacific Railroad	0-3	GIS Map	IOC, VOC, SOC, Microbes
1, 2	LUST site, cleanup completed, impact: unknown; UST site, gas station, closed	0-3	Database Search	VOC, SOC
3	Hardware Store	0-3	Database Search	IOC, VOC, SOC
4	Tractor – Repairing & Servicing	0-3	Database Search	IOC, VOC, SOC
5	Machine Shop	0-3	Database Search	IOC, VOC, SOC
6	Sand and Gravel Pit	0-3	Database Search	IOC, VOC, SOC
7	Sand and Gravel Pit	0-3	Database Search	IOC, VOC, SOC
8	SARA Site, Farm Supplies	0-3	Database Search	IOC, SOC, Microbes
9	AST	0-3	Database Search	IOC, VOC, SOC
10, 11	WLAP site, potato processing	0-3	Database Search	IOC, Microbes
12	Dairy, 1000-1500 Cows	6-10	Database Search	IOC, Microbes
	Twin Falls Main Canal	3-6, 6-10	GIS Map	IOC, VOC, SOC, Microbes
	Highway 30	3-6, 6-10	GIS Map	IOC,VOC, SOC, Microbes
	Murtaugh Lake	6-10	GIS Map	IOC,VOC, SOC, Microbes

[1] LUST = leaking underground storage tank, UST = underground storage tank, SARA = Superfund Amendments and Reauthorization Act, AST = aboveground storage tank, WLAP = wastewater land application permit
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Well #2 has a delineated source water assessment area that is crossed by the Union Pacific Railroad, Highway 30, the Twin Falls Main Canal, and Murtaugh Lake (Table 2). Highway 30 and the Union Pacific Railroad represent potential sources of contamination because they are transportation corridors. Accidental releases of contaminants on these corridors, within the source water assessment area, could spill IOCs, VOCs, SOCs, or microbial contaminants on to the well-drained soil. These potential contaminants could migrate down through the fractured basalt in the vadose zone and possibly contaminate the City of Murtaugh's source water. Similarly, the Twin Falls Main Canal and Murtaugh Lake are listed as a potential contaminant source because leakage from canals and surface water bodies in the source water assessment area is known to recharge the aquifer (Cosgrove, et al., 1997). Consequently, if a spill occurs and contaminants are transported through the source water assessment area by the canal or the lake, contaminants could leach into the City of Murtaugh's source water.

Three other identified potential sources of contamination are located in the source water assessment area, with the dairy being located in the 3-year TOT zone. Figure 3 shows the locations of these various potential contaminant sites relative to the wellhead.

Table 2. City of Murtaugh, Well #2, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	Union Pacific Railroad	0-3, 3-6, 6-10	GIS Map	IOC, VOC, SOC, Microbes
1	Dairy, 1000-1500 Cows	0-3	Database Search	IOC, Microbes
	Highway 30	0-3, 3-6, 6-10	GIS Map	IOC,VOC, SOC, Microbes
2	SARA Site, Farm Supplies	6-10	Database Search	IOC, SOC, Microbes
3	Recharge point	6-10	Database Search	IOC, VOC, SOC
	Twin Falls Main Canal	3-6, 6-10	GIS Map	IOC, VOC, SOC, Microbes
	Murtaugh Lake	3-6, 6-10	GIS Map	IOC,VOC, SOC, Microbes

[1] SARA = Superfund Amendments and Reauthorization Act
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity to potential contaminants is high for the City Well and moderate for Well #2 (Table 3). Giving a higher (less protective) score are the assessment that the soils contained within each of the delineations rate as moderately to well-drained, the assessment that the vadose zone surrounding each of the wellheads is predominantly fractured basalt, and the assessment that the first ground water is located within 300 feet of ground surface. The City Well log does not show is suitably thick low permeability unit between the surface and the producing zone. The Well #2 log shows a low permeability clay and silt layer from 103 to 162 feet below ground surface (bgs), resulting in a lower score.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The system construction score was moderate for the City Well. A Sanitary Survey, conducted in 1999, assessed that the City Well is not in the 100-year flood zone and is protected from surface flooding and maintains sanitary standards related to wellhead and surface seal protection. A well log was not available for the City Well. Consequently, it was not possible to determine whether or not the City Well meets current IDWR standards and the Recommended Standards for Water Works (1997).

The system construction score was high for Well #2. Well #2, constructed in 2002 to a depth of over 1,200 feet bgs, has a 20-inch diameter casing with a 0.375-inch thickness set to a depth of 65 feet bgs into "dark gray basalt." The annular seal was installed to a depth of 65 feet bgs into "dark gray basalt." The static water level is found at 78 feet bgs and the highest producing zone appears to be between 162 feet and 383 feet bgs. The well is not screened. A two-hour pump test is recorded on the well log. Drilling to a depth of 1,200 feet bgs did not produce sufficient water to make Well #2 a viable source for the City of Murtaugh. At the time of this report, no sanitary survey had been conducted on Well #2, so scores were conservatively raised.

Though the City Well of the City of Murtaugh may have met standards at the time of construction, current well construction standards are stricter. The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules* (1993) require all Public Water Systems (PWSs) to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the requirements include casing thickness, well tests, and depth and formation type that the surface seal must be installed into. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Eight-inch diameter wells require a casing thickness of at least 0.322-inches. Twelve-inch to 20-inch diameter wells require a casing thickness of at least 0.375 inches. Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate. Without a well log, insufficient information was available to determine if the City Well meets current construction standards. Well log information for Well #2 was insufficient to determine if an adequate pump test was conducted for this well. Until such time as the appropriate information can be supplied, both the City Well and Well #2 will be assessed an additional point for well construction.

Potential Contaminant Sources and Land Use

The City Well water rated high for susceptibility to potential contamination from IOCs (e.g., nitrates), VOCs (e.g., petroleum products) and SOCs (e.g., pesticides), and low for susceptibility to potential microbial contamination (e.g., total coliform). Well #2 rated high for IOCs and SOCs, and moderate for VOCs and microbial contaminants. Agricultural land use, the presence of a nitrate priority area, high countywide farm chemical use, and the presence of multiple potential contaminant sources within the delineated source water assessment area contributed to the rankings for IOCs, VOCs, and SOCs. The difference in the rating for land use susceptibility for the two wells is due to the reduced number of identified potential contaminant sources within the Well #2 delineation.

Final Susceptibility Ranking

A detection above a drinking water standard MCL or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and a large percentage of agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, the City Well and Well #2 water rate high for IOC, VOC, SOC, and microbial contamination. Aquifer and vadose zone properties, agricultural land use, and the presence of multiple potential contaminant sources within the delineated source water assessment areas are major factors in the susceptibility scores. The presence of a nitrate priority area and high countywide farm chemical use also contributed to the susceptibility ranking.

Table 3. Summary of the City of Murtaugh Well Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbes		IOC	VOC	SOC	Microbials
City Well	H	H	H	H	L	M	H	H	H	H
Well #2	M	H	M	H	M	H	H	H	H	H

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, the City Well and Well #2 water rate high for IOC, VOC, SOC, and microbial contamination. The major difference between the two wells is the assessment from the Well #2 well log showing a thick low permeability unit. The addition of a sanitary survey showing that wellhead and surface seal requirements have been met for Well #2 and well test information showing compliance with the IDWR *Well Construction Standards Rules* (1993) regarding well testing requirements could lower the final susceptibility scores. If a well log could be provided for the City Well, those scores might be reduced as well.

Well #2 will not attain "active" status, but instead is in the process of being properly plugged and abandoned according to the regulations. In addition, a different drill site is being identified. Though

the delineation and susceptibility of Well #2 is detailed in this report, the City of Murtaugh does not intend to bring Well #2 online.

Arsenic and nitrates represent the main water chemistry issues recorded for the public water system. Arsenic was detected in the City Well water in March 1997 and August 2000 at concentrations close to the new MCL. Nitrate was detected in the City Well water from December 1997 to August 2000 at concentrations just below 80% of the MCL. Single detections of barium, chromium, and trihalomethanes were reported for the City Well at concentrations well below the respective MCLs. Trihalomethanes are commonly detected in drinking water disinfected with chlorine. The IOCs, arsenic, barium, and chromium, detected in the City Well may be naturally occurring in the formations in which the well was developed. No VOCs (other than trihalomethanes), SOCs, or microbial contaminants were recorded in the City Well.

A nitrate priority area crosses the delineated source water area of the City Well. Countywide farm chemical use is considered high in this area and the delineated source water area for the wells is surrounded by a significant amount of irrigated agricultural land. Additionally, multiple potential sources of contamination exist in the delineated source water area for the City Well.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local source water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of Murtaugh, drinking water protection activities should focus on implementation of the certified Drinking Water Protection Plan. Since concentrations of nitrates and arsenic in the City Well water approach the MCL, the City of Murtaugh should investigate various systems that could be used to treat these chemicals. Disinfection practices should be optimized in order to minimize the formation of trihalomethanes in the water extracted from the City Well.

Though water quality is generally good for the City of Murtaugh, the highly fractured nature of the basalt aquifer could lead to cross-contamination from shallower fractures to deeper fractures depending on well construction. Any spills from Highway 30, the Union Pacific Railroad, the Twin Falls Main Canal, Murtaugh Lake, or the agricultural property in the delineated source water assessment area should be monitored carefully. The City of Murtaugh should also be diligent about monitoring spills from businesses with potential IOC, VOC, SOC, or microbial contaminants. Any surface releases should be monitored to prevent contaminants from infiltrating to the ground water producing zones. Most of the designated source water protection areas are outside the direct jurisdiction of City of Murtaugh. Twin Falls County has a Wellhead Protection Overlay District Ordinance that can provide additional protection for areas outside of the direct jurisdiction of the City of Murtaugh. Partnerships with state and local agencies and industry groups should be established and are critical to success. Continued vigilance in keeping the well protected from surface flooding can also keep the potential for contamination reduced. Due to the time involved with the movement of ground water, wellhead

protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Twin Falls Regional DEQ Office (208) 736-2190

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, (mlharper@idahoruralwater.com) Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as "Superfund" is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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Attachment A

City of Murtaugh
Susceptibility Analysis
Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name :MURTAUGH CITY OF Well# : CITY WELL Public Water System Number 5420042 5/18/01 12:54:38 PM

1. System Construction		SCORE				
Drill Date		1/1/74				
Driller Log Available		NO				
Sanitary Survey (if yes, indicate date of last survey)		YES	1999			
Well meets IDWR construction standards		NO	1			
Wellhead and surface seal maintained		YES	0			
Casing and annular seal extend to low permeability unit		NO	2			
Highest production 100 feet below static water level		NO	1			
Well located outside the 100 year flood plain		YES	0			
	Total System Construction Score		4			
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained		NO	2			
Vadose zone composed of gravel, fractured rock or unknown		YES	1			
Depth to first water > 300 feet		NO	1			
Aquitard present with > 50 feet cumulative thickness		NO	2			
	Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A			IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED FARMLAND		2	2	2	2
Farm chemical use high		YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A		NO	NO	NO	NO	NO
	Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B						
Contaminant sources present (Number of Sources)		YES	9	8	9	3
(Score = # Sources X 2) 8 Points Maximum			8	8	8	6
Sources of Class II or III leacheable contaminants or		YES	9	5	4	
4 Points Maximum			4	4	4	
Zone 1B contains or intercepts a Group 1 Area		YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land		4	4	4	4
	Total Potential Contaminant Source / Land Use Score - Zone 1B		18	16	16	10
Potential Contaminant / Land Use - ZONE II						
Contaminant Sources Present		YES	2	2	2	
Sources of Class II or III leacheable contaminants or		YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land		2	2	2	
	Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present		YES	1	1	1	
Sources of Class II or III leacheable contaminants or		YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of		YES	1	1	1	
	Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score			30	26	28	12
4. Final Susceptibility Source Score			16	15	16	15
5. Final Well Ranking			High	High	High	High

1. System Construction		SCORE			
Drill Date	12/31/02				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	NO				
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	NO	1			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	1			
Total System Construction Score		5			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		4			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED FARMLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	2	2	3
(Score = # Sources X 2) 8 Points Maximum		6	4	4	6
Sources of Class II or III leacheable contaminants or	YES	7	2	2	
4 Points Maximum		4	2	2	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	10	10	10
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		28	20	22	12
4. Final Susceptibility Source Score		15	13	13	14
5. Final Well Ranking		High	High	High	High